

## EXECUTIVE SUMMARY

Inventory was conducted in 2000 on the area burned by the Alkali Creek Fire in 1996 and adjacent comparable landscapes to identify plant associations, successional pathways and seral stages present. The study area encompasses highly convoluted terrain most of which is, or verges on, breaklands developed from erodible sedimentary parent materials. Thirteen plant associations are identified, of which two are provisional upland types described for the first time. The great majority of the landscape is dominated, or potentially dominated, by three upland matrix types: woodland, grassland, and much reduced in extent, a shrub herbaceous type. Relatively moist to wet environments comprise a small fraction of the landscape including seasonally or temporarily flooded coulee bottoms and alluvial fans and terraces.

Despite a four-year lapse between the Alkali Creek Fire and documenting fire's effects by vegetation type, alternative measures were used to distinguish the severity and intensity of the fire, mostly with regard to woodland stands. Burns in ponderosa pine (*Pinus ponderosa*) woodland stands rated as high intensity and generally stand-replacing. Moderate and low intensity fire regimes were also documented. Rocky mountain juniper (*Juniperus scopulorum*) is extremely fire-susceptible resulting in its mortality on all burned terrain. Fire severity appears to be positively correlated with burgeoning populations of increaser species (Society for Range Management 1999, cited in Pellant et al. 2000), undesirable aliens, and noxious weeds. Low intensity and severity fires favor species typical of later seral stages. Response of stands in which shrubs comprise an important component depends in large part on the evolved post-burn strategy of the component species with crown sprouters, such as black greasewood (*Sarcobatus vermiculatus*) and silver sagebrush (*Artemisia cana*), developing much more quickly to reestablish their pre-burn contribution. Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) is extremely fire-susceptible and has been eliminated over much of this landscape. Our impressions and literature-documented findings indicate that succession is slower in these habitats, at least in regards to re-establishing the sagebrush component, than has hitherto been appreciated. Fire in grassland vegetation types is seldom, if ever, stand-replacing; rather, it is difficult to gauge fire effects in grasslands without having a pre-burn inventory. In this landscape thickspike wheatgrass (*Elymus lanceolatus*) is ubiquitous, the grassland dominant and stimulated by fire (though first-year post-burn depression in production is possible) with doubling and tripling of cover (in at least some habitats) for the two to four years following burning. We speculate there has been a post-burn increase in the alien annual grass, Japanese brome (*Bromus japonicus*), which can be attributed to both the burn and possibly the build up of litter.

Though this type of landscape is not unique in geology or landform and does not contain any rare communities or species deemed to be of special concern, it is in excellent ecological condition with a minimum of weedy species. The Alkali Creek Fire probably was of greater extent than previous fires in this landscape and we speculate that certainly the number of woodland stands that experienced stand-replacing intensities was outside the natural range of variation. Permanent plots should be established to track the course of succession on the woodland and shrubland portions of this landscape.

**Wildfire Succession in Plant Communities  
Natural to the Alkali Creek Vicinity,  
Charles M. Russell National Wildlife Refuge,  
Montana**

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